WHAT IS CLAIMED IS:

1. A semiconductor device having a thin film transistor formed of a crystalline semiconductor film that contains silicon as its main ingredient and germanium, wherein:

the crystalline semiconductor film has a channel formation region and an impurity region that is doped with an impurity of one type of conductivity;

20% or more of the channel formation region is the {101} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film, the plane being detected by an electron backscatter diffraction pattern method;

3% or less of the channel formation region is the {001} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film;

5% or less of the channel formation region is the {111} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film; and

secondary ion mass spectroscopy is conducted on the channel formation region to reveal that the region contains less than 5 x 10^{18} nitrogen atoms per cm^3, less than 5 x 10^{18} carbon atoms per cm^3, and less than 1 x 10^{19} oxygen atoms per cm^3.

2. A device according to claim 1, wherein the channel formation region contains the metal element in a concentration of

less than 1 x 10^{17} atoms/cm^3.

3. A device according to claim 2, wherein one or more elements are selected, as the metal element, from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu and Au.

4. A device according to claim 1, wherein the crystalline semiconductor film contains germanium in a concentration of equal to or more than 0.1 atomic percent and equal to or less than 10 atomic percent.

5. A device according to claim 1, wherein the crystalline semiconductor film has a thickness of 20 to 100 nm.

6. A device according to claim 1, wherein the spacing in the lattice plane that is horizontal to the surface of the crystalline semiconductor film is different from the spacing in the lattice plane inclined 60 degree with respect to the surface of the crystalline semiconductor film, and the difference is more than 0 and equal to or less than 0.002 nm in terms of lattice constant.

7. A device according to claim 1, wherein the semiconductor device is a device selected from the group consisting of a cellular phone, a video camera, a portable information terminal, a television broadcasting receiving unit, an electronic book, a personal computer,

a DVD player and a digital still camera.

8. A semiconductor device having a thin film transistor formed by doping an amorphous semiconductor film with a metal element and by subjecting it to heat treatment and laser treatment, the amorphous semiconductor film containing silicon as its main ingredient and germanium, wherein:

the crystalline semiconductor film has a channel formation region and an impurity region that is doped with an impurity of one type of conductivity;

20% or more of the channel formation region is the {101} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film, the plane being detected by an electron backscatter diffraction pattern method;

3% or less of the channel formation region is the {001} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film;

5% or less of the channel formation region is the {111} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film; and

secondary ion mass spectroscopy is conducted on the channel formation region to reveal that the region contains less than 5 x 10^{18} nitrogen atoms per cm^3, less than 5 x 10^{18} carbon atoms per cm^3, and less than 1 x 10^{19} oxygen atoms per cm^3.

9. A device according to claim 8, wherein the channel formation region contains the metal element in a concentration of less than 1×10^{17} atoms/cm^3.

10. A device according to claim 9, wherein one or more elements are selected, as the metal element, from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu and Au.

11. A device according to claim 8, wherein the crystalline semiconductor film contains germanium in a concentration of equal to or more than 0.1 atomic percent and equal to or less than 10 atomic percent.

12. A device according to claim 8, wherein the crystalline semiconductor film has a thickness of 20 to 100 nm.

13. A device according to claim 8, wherein the spacing in the lattice plane that is horizontal to the surface of the crystalline semiconductor film is different from the spacing in the lattice plane inclined 60 degree with respect to the surface of the crystalline semiconductor film, and the difference is more than 0 and equal to or less than 0.002 nm in terms of lattice constant.

14. A device according to claim 8, wherein the semiconductor

device is a device selected from the group consisting of a cellular phone, a video camera, a portable information terminal, a television broadcasting receiving unit, an electronic book, a personal computer, a DVD player and a digital still camera.

15. A semiconductor device whose pixel portion and driver circuit are formed on a same insulator, wherein:

thin film transistors in the pixel portion and in the driver circuit are all n-channel transistors;

each of the thin film transistors has a channel formation region formed of a crystalline semiconductor film that contains silicon as its main ingredient and germanium;

20% or more of the crystalline semiconductor film is the {101} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film, the plane being detected by an electron backscatter diffraction pattern method;

3% or less of the crystalline semiconductor film is the {001} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film;

5% or less of the crystalline semiconductor film is the {111} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film; and

secondary ion mass spectroscopy is conducted on the

crystalline semiconductor film to reveal that the film contains less than 5×10^{18} nitrogen atoms per cm^3, less than 5×10^{18} carbon atoms per cm^3, and less than 1×10^{19} oxygen atoms per cm^3.

16. A device according to claim 15, wherein the channel formation region contains the metal element in a concentration of less than 1×10^{17} atoms/cm^3.

17. A device according to claim 16, wherein one or more elements are selected, as the metal element, from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu and Au.

18. A device according to claim 15, wherein the crystalline semiconductor film contains germanium in a concentration of equal to or more than 0.1 atomic percent and equal to or less than 10 atomic percent.

19. A device according to claim 15, wherein the crystalline semiconductor film has a thickness of 20 to 100 nm.

20. A device according to claim 15, wherein the spacing in the lattice plane that is horizontal to the surface of the crystalline semiconductor film is different from the spacing in the lattice plane inclined 60 degree with respect to the surface of the crystalline semiconductor film, and the difference is more than 0 and equal

to or less than 0.002 nm in terms of lattice constant.

21. A device according to claim 15, wherein the semiconductor device is a device selected from the group consisting of a cellular phone, a video camera, a portable information terminal, a television broadcasting receiving unit, an electronic book, a personal computer, a DVD player and a digital still camera.

22. A semiconductor device whose pixel portion and driver circuit are formed on a same insulator, wherein:

thin film transistors in the pixel portion and in the driver circuit are all p-channel transistors;

each of the thin film transistors has a channel formation region formed of a crystalline semiconductor film that contains silicon as its main ingredient and germanium;

20% or more of the crystalline semiconductor film is the {101} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film, the plane being detected by an electron backscatter diffraction pattern method;

3% or less of the crystalline semiconductor film is the {001} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film;

5% or less of the crystalline semiconductor film is the {111} lattice plane that forms an angle of equal to or less than 10 degree

with respect to the surface of the crystalline semiconductor film; and

secondary ion mass spectroscopy is conducted on the crystalline semiconductor film to reveal that the film contains less than 5×10^{18} nitrogen atoms per cm^3, less than 5×10^{18} carbon atoms per cm^3, and less than 1×10^{19} oxygen atoms per cm^3.

23. A device according to claim 22, wherein the channel formation region contains the metal element in a concentration of less than 1×10^{17} atoms/cm^3.

24. A device according to claim 23, wherein one or more elements are selected, as the metal element, from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu and Au.

25. A device according to claim 22, wherein the crystalline semiconductor film contains germanium in a concentration of equal to or more than 0.1 atomic percent and equal to or less than 10 atomic percent.

26. A device according to claim 22, wherein the crystalline semiconductor film has a thickness of 20 to 100 nm.

27. A device according to claim 22, wherein the spacing in the lattice plane that is horizontal to the surface of the crystalline

semiconductor film is different from the spacing in the lattice plane inclined 60 degree with respect to the surface of the crystalline semiconductor film, and the difference is more than 0 and equal to or less than 0.002 nm in terms of lattice constant.

28. A device according to claim 22, wherein the semiconductor device is a device selected from the group consisting of a cellular phone, a video camera, a portable information terminal, a television broadcasting receiving unit, an electronic book, a personal computer, a DVD player and a digital still camera.

29. A semiconductor device whose pixel portion and driver circuit are formed on a same insulator, wherein:

the driver circuit is composed of an n-channel thin film transistor and a p-channel thin film transistor;

each of the n-channel and p-channel thin film transistors has a channel formation region formed of a crystalline semiconductor film that contains silicon as its main ingredient and germanium;

20% or more of the crystalline semiconductor film is the {101} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film, the plane being detected by an electron backscatter diffraction pattern method;

3% or less of the crystalline semiconductor film is the {001} lattice plane that forms an angle of equal to or less than 10 degree

with respect to the surface of the crystalline semiconductor film;

5% or less of the crystalline semiconductor film is the {111} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film; and

secondary ion mass spectroscopy is conducted on the crystalline semiconductor film to reveal that the film contains less than 5×10^{18} nitrogen atoms per cm^3, less than 5×10^{18} carbon atoms per cm^3, and less than 1×10^{19} oxygen atoms per cm^3.

30. A device according to claim 29, wherein the channel formation region contains the metal element in a concentration of less than 1×10^{17} atoms/cm^3.

31. A device according to claim 30, wherein one or more elements are selected, as the metal element, from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu and Au.

32. A device according to claim 29, wherein the crystalline semiconductor film contains germanium in a concentration of equal to or more than 0.1 atomic percent and equal to or less than 10 atomic percent.

33. A device according to claim 29, wherein the crystalline semiconductor film has a thickness of 20 to 100 nm.

34. A device according to claim 29, wherein the spacing in the lattice plane that is horizontal to the surface of the crystalline semiconductor film is different from the spacing in the lattice plane inclined 60 degree with respect to the surface of the crystalline semiconductor film, and the difference is more than 0 and equal to or less than 0.002 nm in terms of lattice constant.

35. A device according to claim 29, wherein the semiconductor device is a device selected from the group consisting of a cellular phone, a video camera, a portable information terminal, a television broadcasting receiving unit, an electronic book, a personal computer, a DVD player and a digital still camera.

36. A semiconductor device whose pixel portion is formed on an insulator, wherein:

thin film transistors in the pixel portion each have a channel formation region formed of a crystalline semiconductor film that contains silicon as its main ingredient and germanium;

20% or more of the channel formation region is the {101} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film, the plane being detected by an electron backscatter diffraction pattern method;

3% or less of the channel formation region is the {001} lattice

plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film;

5% or less of the channel formation region is the {111} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film; and

secondary ion mass spectroscopy is conducted on the channel formation region to reveal that the region contains less than 5 x 10^{18} nitrogen atoms per cm^3, less than 5 x 10^{18} carbon atoms per cm^3, and less than 1 x 10^{19} oxygen atoms per cm^3.

37. A device according to claim 36, wherein the channel formation region contains the metal element in a concentration of less than 1 x 10^{17} atoms/cm^3.

38. A device according to claim 37, wherein one or more elements are selected, as the metal element, from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu and Au.

39. A device according to claim 36, wherein the crystalline semiconductor film contains germanium in a concentration of equal to or more than 0.1 atomic percent and equal to or less than 10 atomic percent.

40. A device according to claim 36, wherein the crystalline semiconductor film has a thickness of 20 to 100 nm.

41. A device according to claim 36, wherein the spacing in the lattice plane that is horizontal to the surface of the crystalline semiconductor film is different from the spacing in the lattice plane inclined 60 degree with respect to the surface of the crystalline semiconductor film, and the difference is more than 0 and equal to or less than 0.002 nm in terms of lattice constant.

42. A device according to claim 36, wherein the semiconductor device is a device selected from the group consisting of a cellular phone, a video camera, a portable information terminal, a television broadcasting receiving unit, an electronic book, a personal computer, a DVD player and a digital still camera.

43. A semiconductor device whose pixel portion and driver circuit are formed on a same insulator, wherein:

the driver circuit includes a buffer composed of thin film transistors of one type of conductivity;

the buffer has a first one conductivity thin film transistor and a second one conductivity thin film transistor, the second one conductivity thin film transistor being connected to the first one conductivity thin film transistor in series and having as its gate a drain of the first one conductivity thin film transistor;

each of the first and second thin film transistors has a channel formation region formed of a crystalline semiconductor film

that contains silicon as its main ingredient and germanium;

20% or more of the crystalline semiconductor film is the {101} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film, the plane being detected by an electron backscatter diffraction pattern method;

3% or less of the crystalline semiconductor film is the {001} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film;

5% or less of the crystalline semiconductor film is the {111} lattice plane that forms an angle of equal to or less than 10 degree with respect to the surface of the crystalline semiconductor film; and

secondary ion mass spectroscopy is conducted on the crystalline semiconductor film to reveal that the film contains less than 5×10^{18} nitrogen atoms per cm^3, less than 5×10^{18} carbon atoms per cm^3, and less than 1×10^{19} oxygen atoms per cm^3.

44. A device according to claim 43, wherein the channel formation region contains the metal element in a concentration of less than 1×10^{17} atoms/cm^3.

45. A device according to claim 44, wherein one or more elements are selected, as the metal element, from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt, Cu and Au.

46. A device according to claim 43, wherein the crystalline semiconductor film contains germanium in a concentration of equal to or more than 0.1 atomic percent and equal to or less than 10 atomic percent.

47. A device according to claim 43, wherein the crystalline semiconductor film has a thickness of 20 to 100 nm.

48. A device according to claim 43, wherein the spacing in the lattice plane that is horizontal to the surface of the crystalline semiconductor film is different from the spacing in the lattice plane inclined 60 degree with respect to the surface of the crystalline semiconductor film, and the difference is more than 0 and equal to or less than 0.002 nm in terms of lattice constant.

49. A device according to claim 43, wherein the semiconductor device is a device selected from the group consisting of a cellular phone, a video camera, a portable information terminal, a television broadcasting receiving unit, an electronic book, a personal computer, a DVD player and a digital still camera.

50. A device according to claim 22, wherein the driver circuit includes a decoder composed of a plurality of NAND circuits.

51. A device according to claim 22, wherein the driver circuit includes a shift register that is composed of a flip-flop circuit comprised of an enhancement type thin film transistor and a depression type thin film transistor.

52. A device according to claim 29, wherein the driver circuit includes a decoder composed of a plurality of NAND circuits.